

Arizona's Public Water System Screening for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) Final Report

NOVEMBER 2018

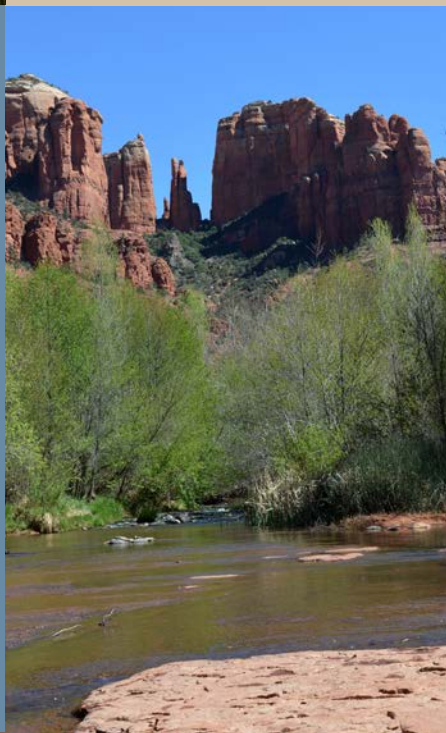






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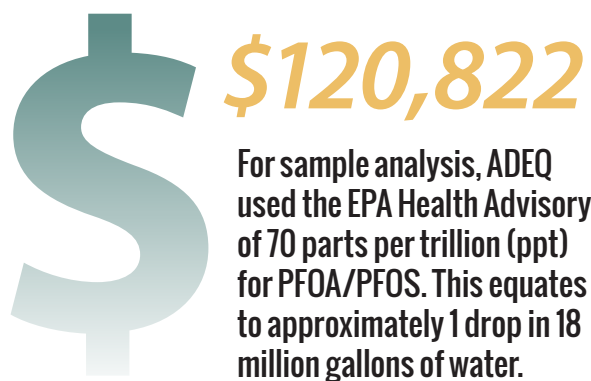
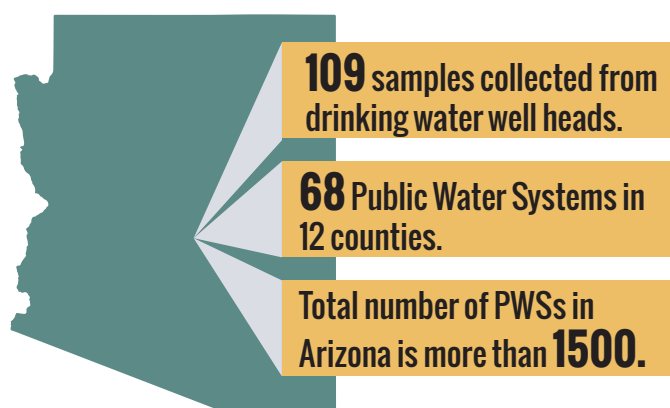
EXECUTIVE SUMMARY

The Arizona Department of Environmental Quality (ADEQ) prepared this report for the U.S. Environmental Protection Agency (EPA) to fulfill the requirements of a multi-purpose grant. The purpose of the grant was to screen Public Water System (PWS) drinking water wells in Arizona potentially impacted by perfluorooctanoic acid (PFOA) and/or perfluorooctane sulfonate (PFOS) contamination.

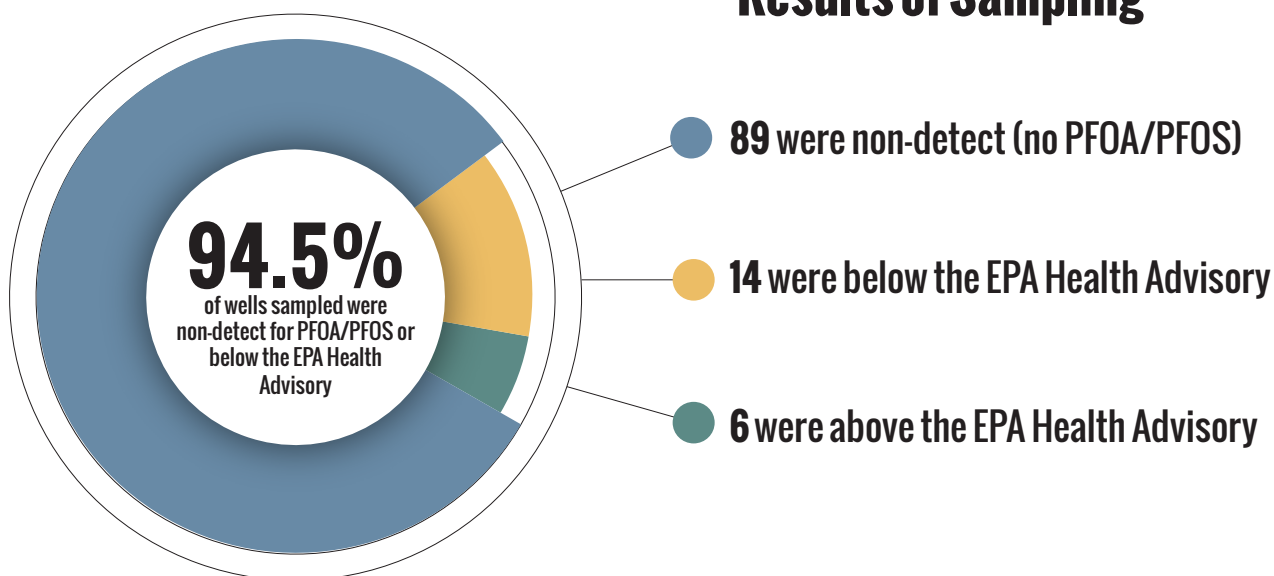
The project focus was on PWSs near facilities that currently or historically may have used PFOA/PFOS. This included industrial, firefighting training facilities, manufacturing, airports and military sites. Research indicated that PFOA/PFOS compounds were not used on large-scale industrial applications in Arizona. There are no known facilities in Arizona that have manufactured these chemicals.

Data from facility analysis and sampling indicate that PFOA/PFOS are not widespread throughout Arizona and tends to be localized near potential sources.

Project Scope:



Results of Sampling



BACKGROUND

PFOA/PFOS are man-made chemicals that have been manufactured and used in a variety of industries since the 1940s. The compounds can be found in firefighting foams, food packaging, stain and water-repellent fabrics, Teflon™ and chemicals used at paper mills.

A growing awareness nationally about these chemicals and Unregulated Contaminant Monitoring Rule 3 (UCMR3) data sparked ADEQ's interest in taking proactive steps to determine if these constituents were present in Arizona drinking water wells. ADEQ was awarded an EPA multi-purpose grant of \$120,822 on August 22, 2016 to sample PWS drinking water wells to determine if they had been impacted with PFOA/PFOS. The purpose of the grant was to further investigate potential risk to PWS drinking water wells that were not previously sampled that could be impacted by PFOA/PFOS contamination.*

**Data for this project came from sampling PWS drinking water well heads; whereas, UCMR3, samples were collected at the entrance to the distribution system.*

METHODOLOGY

ADEQ developed GIS maps, which showed facilities that currently or historically may have used PFOA/PFOS. ADEQ used Standard Industrial Classification Codes (SIC) and conducted extensive research to identify these facilities. Based on hydrogeologic data, ADEQ then identified PWS drinking water well locations within a two-mile radius of the facility. Non-regulated water systems were not included in this screening as that was outside the scope of this project.

Selection criteria for sampling was determined by:

- Aquifer characteristic evaluations of groundwater velocities and flow direction where adequate information was available.
- Well construction data evaluations to determine regional subsurface lithology.
- Flow direction analysis to identify wells located up gradient, cross gradient and down gradient of flow directions to ensure all wells that may have been impacted were sampled since local groundwater movement often varies from regional flow direction.

PWSs in this screening varied in number of customers served (Figure 1, pg 6). ADEQ identified 162 PWS drinking water wells for screening (Figure 2, pg 6). ADEQ determined 100 wells at 68 different PWSs met the selection criteria for sampling. ADEQ also received data from some PWSs for 9 additional wells (Figure 2). ADEQ requested sampling data for 8 other wells, but data were not received.

Sampling was conducted by ADEQ's contractor (P.G. Environmental) per the EPA approved sampling plan "ADEQ Quality Assurance and Sampling Plan for Polyfluorinated Compounds at Public Water Systems". Sampling protocols in this plan were strictly followed in order to eliminate false positives. Samples were transported within 24 hours to Eaton Eurofins, Inc. for analysis per EPA Analytical Method 537. Sampling was conducted from January through May 2018. Sampling data can be found in Appendix D.

If there was an exceedance of the EPA Health Advisory in the sample gathered at a PWS drinking water well head, ADEQ employed the EPA approved PFOA/PFOS Communications Plan and recommended the following Corrective Action(s) be considered by the PWS:

- **INFORM** | PWS should issue a public notice (Appendix G) to affected customers about the levels of PFOA/PFOS in their drinking water.
- **LIMIT EXPOSURE** | Provide bottled water or an alternative source of drinking water to consumers while taking remedial action(s).
- **TREAT or BLEND** | water source(s) to ensure drinking water at the entry point to the distribution system is below the EPA Health Advisory.

Figure 1:

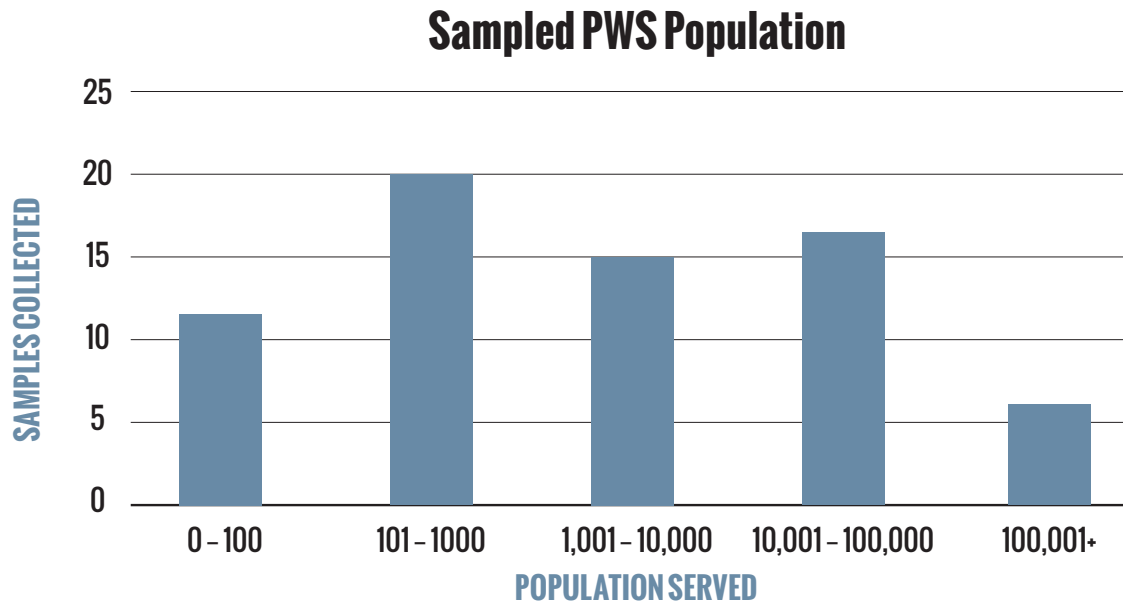
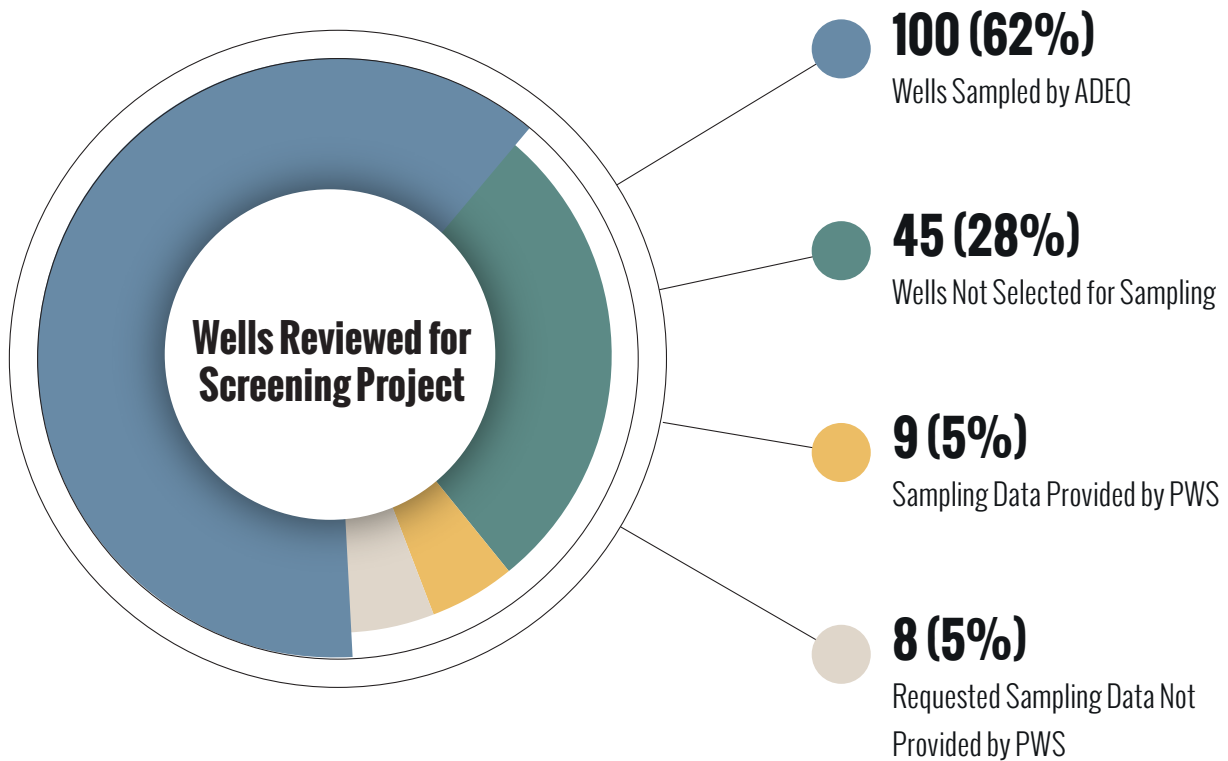


Figure 2:



RESULTS AND CONCLUSIONS

PFOA/PFOS contamination in Arizona PWSs is not widespread and tends to be near potential sources. Potential sources included industrial, firefighting training facilities, manufacturing, airports and military sites. Research of potential sources indicates PFOA/PFOS compounds were not used for large scale industrial applications in Arizona and there are no known facilities in Arizona that have manufactured these chemicals.

Out of over 1500 PWSs in Arizona, 68 were identified as having drinking water wells located near potential sources, and 100 wells met the selection criteria for sampling. Data showed 89 wells (81.7%) were non-detect, 8 wells (12.8%) were below the EPA Health Advisory and 6 wells (5.5%) were above the EPA Health Advisory. For those above the EPA Health Advisory, the data ranged from 72 to 166 ppt. Data is available in Appendix D.

ADEQ's first priority is to limit exposure through drinking water. For wells with sample data indicating PFOA/PFOS above the EPA Health Advisory, a communications plan was shared with the PWS. Because PFOA/PFOS is an unregulated compound, PWSs are working voluntarily with ADEQ to address the contamination. Information on the current status of ADEQ's work with impacted PWSs is available in Appendix H.

POTENTIAL ACTIONS

ADEQ is considering the following activities as part of our continuing effort to address concerns about PFOA/PFOS in Arizona:

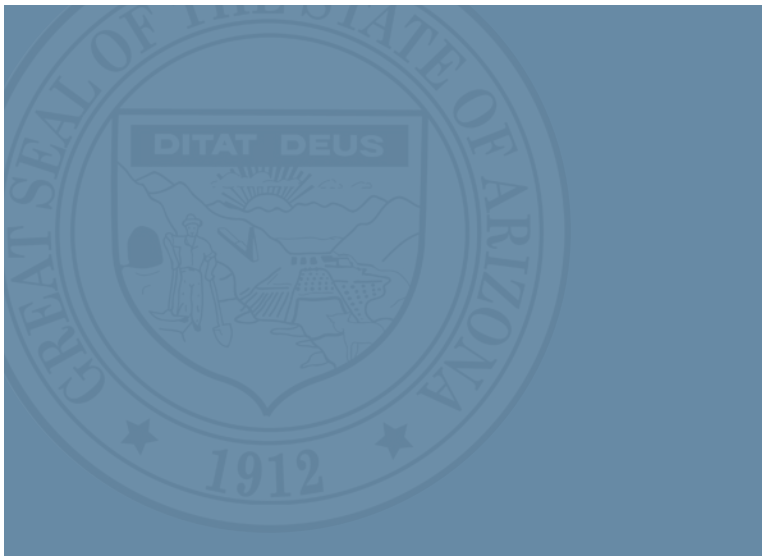
- Develop a strategy to help drinking water systems impacted by PFOA/PFOS contamination.
- Provide a summary of sampling results of PFOA/PFOS contamination to industrial, firefighting training facilities, manufacturing, airports and military sites near wells where these contaminants were detected.
- Participate in the potentially changing regulatory landscape for PFOA/PFOS and other Poly- and Perfluorinated compounds as additional information becomes available.

WHAT CAN THE EPA DO TO HELP?

- Quickly and efficiently establish a Maximum Contaminate Level (MCL) for PFOA/PFOS.
- Evaluate the need for a MCL for other Poly- and Perfluorinated compounds in drinking water.
- Provide funding to resample wells where results were above the EPA Health Advisory to confirm the results of the initial screening project.
- Provide funding to locate private drinking water wells and monitoring wells in the areas where contaminants were detected. Analyze the hydrogeologic data and sample these wells for PFOA/PFOS when appropriate.
- Keep ADEQ informed on current information regarding Poly- and Perfluorinated compounds, including include health effects, regulation and analytical data collected in Arizona.
- Continue to develop analytical methods for Poly- and Perfluorinated compounds in air, soil and water.



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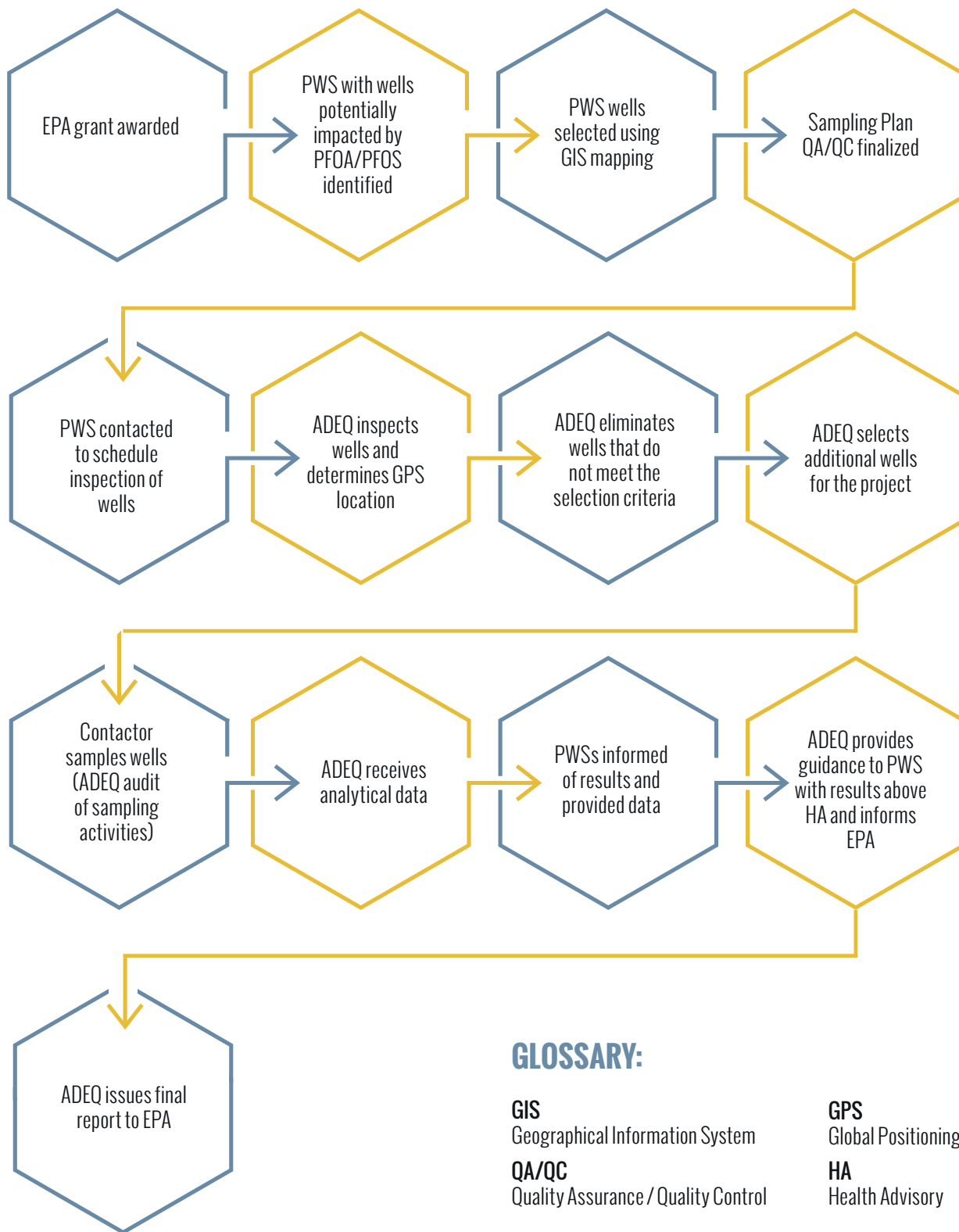


APPENDICES



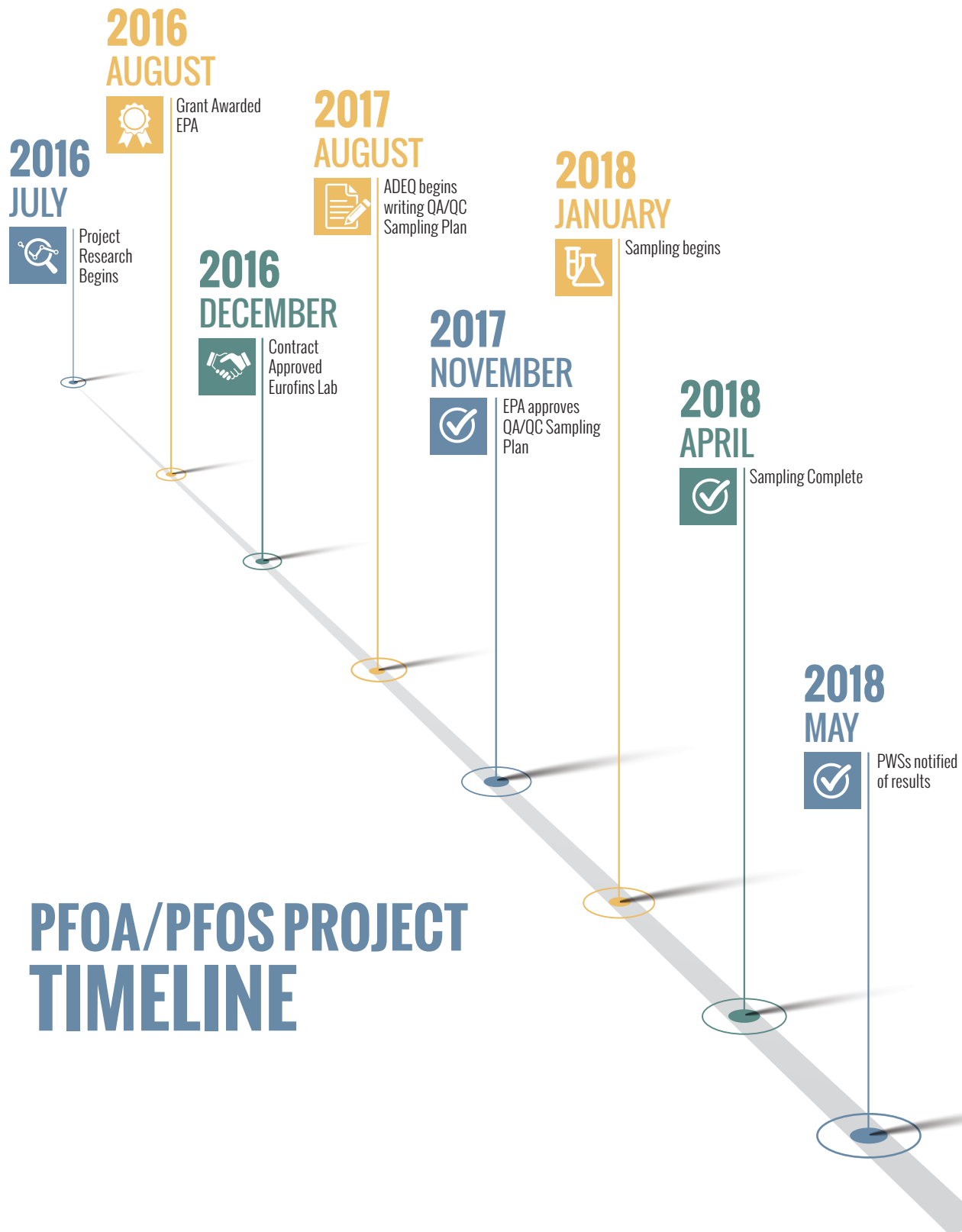
APPENDIX A

FLOW CHART



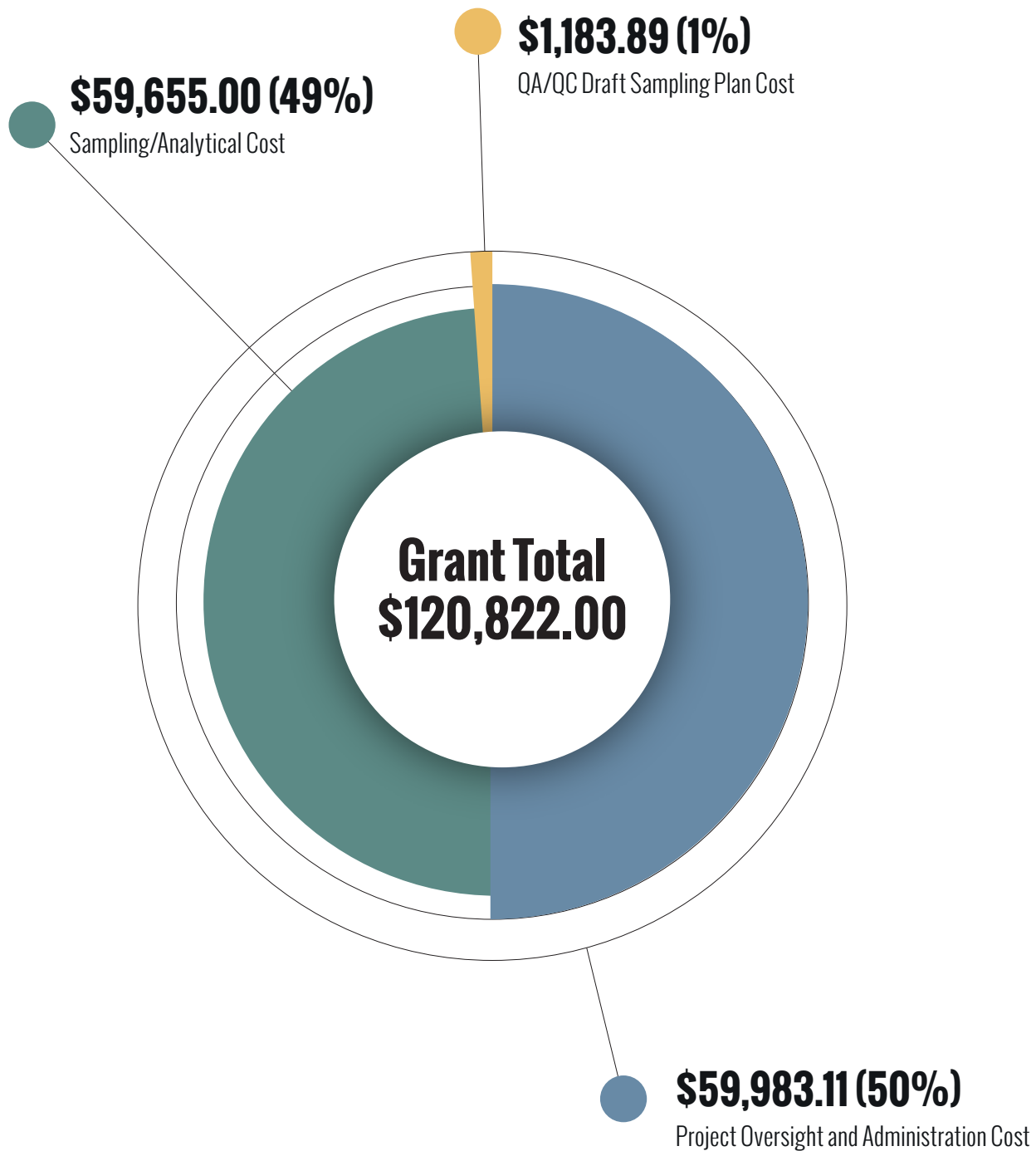
APPENDIX B

TIMELINE



APPENDIX C

EXPENDITURES AND COSTS



APPENDIX D

SCREENING RESULTS

| PWS ID # | PWS Name | Well # | PFOS + PFOA ng/L |
|----------|---------------------------------|-----------|---------------------|
| 09026 | CITY OF SHOW LOW | 55-904169 | ND |
| 03312 | HYDRO RESOURCES-TUSAYAN | 55-523284 | ND |
| 14448 | SUNSET MHP | 55-628972 | ND |
| 07195 | VWC BUCKEYE DIVISION SUN VALLEY | 55-800947 | ND |
| 07462 | BUCKEYE MUNICIPAL AIRPORT | 55-507456 | ND |
| 07633 | HOPEVILLE | 55-800479 | ND |
| 10112 | CITY OF TUCSON | 55-620268 | ND |
| 10112 | CITY OF TUCSON | 55-552118 | ND |
| 20549 | USAF DAVIS MONTHAN AFB | 55-506859 | ND |
| 20549 | USAF DAVIS MONTHAN AFB | 55-621582 | ND |
| 20549 | USAF DAVIS MONTHAN AFB | 55-219602 | ND |
| 10112 | CITY OF TUCSON | 55-533854 | 104.60 |
| 10112 | CITY OF TUCSON | 55-533855 | 80.00 |
| 20041 | EMERY PARK MHP | 55-640042 | 59.00 |
| 02082 | SIERRA VISTA AIRPORT | 55-505189 | ND |
| 02078 | US ARMY FORT HUACHUCA | 55-626108 | ND |
| 02102 | CORONADO ELEMENTARY | 55-087668 | ND |
| 02061 | BISBEE DOUGLAS INTL AIRPORT | 55-516373 | ND |
| 02061 | BISBEE DOUGLAS INTL AIRPORT | 55-606412 | ND |
| 10350 | MARANA CORRECTIONAL FACILITY | 55-586194 | 3.10 |
| 10150 | MARANA MUNICIPAL - MARANA | 55-632633 | 11.90 |
| 11303 | USSOCOM PARACHUTE TRAINING | 55-522505 | 11.90 |
| 11034 | MARANA AEROSPACE SOLUTIONS | 55-617486 | 12.8 |
| 11328 | COPPER MOUNTAIN RANCH CFD | 55-620626 | ND |
| 07911 | FAITH FAMILY CHURCH | 55-215548 | ND |
| 07090 | CHANDLER CITY OF | 55-605314 | ND |
| 07095 | MESA CITY OF | 55-585924 | ND |
| 07098 | SCOTTSDALE CITY OF | 55-626827 | ND |
| 07098 | SCOTTSDALE CITY OF | 55-572377 | ND |
| 07100 | TEMPE CITY OF | 55-628166 | 56.00 |
| 07100 | TEMPE CITY OF | 55-628164 | 29.10 |
| 07093 | GLENDALE CITY OF | 55-217517 | 17.70 |

APPENDIX D CONT.

SCREENING RESULTS

| PWS ID # | PWS Name | Well # | PFOS + PFOA ng/L |
|----------|---------------------------------------|------------|---------------------|
| 07046 | LIBERTY WATER LPSCO | 55-611729 | 33.00 |
| 07541 | X PLICIT SHOW CLUB | 55-217656 | ND |
| 07046 | LIBERTY WATER LPSCO | 55-611726 | 45.00 |
| 07484 | OLIVE AVENUE HOA | 55-599021 | ND |
| 07094 | GOODYEAR WATER DEPARTMENT | 55-218768 | ND |
| 07094 | GOODYEAR WATER DEPARTMENT | 55-218274 | ND |
| 07713 | TRIPLE G DAIRY | 55-582083 | ND |
| 07094 | GOODYEAR WATER DEPARTMENT | 55-501892 | ND |
| 07094 | GOODYEAR WATER DEPARTMENT | 55-609571 | ND |
| 14075 | SUN LEISURE ESTATES UTILITIES COMPANY | 55-610440 | ND |
| 14015 | SOMERTON CITY OF | 55-207524 | ND |
| 14015 | SOMERTON CITY OF | 55-555731 | ND |
| 15013 | PARKER TOWN OF | 55-601139 | ND |
| 15013 | PARKER TOWN OF | 55- 601138 | ND |
| 03008 | FLAGSTAFF CITY OF | 55-907084 | ND |
| 08032 | EPCOR WATER - MOHAVE | 55-603477 | ND |
| 08062 | EPCOR WATER - LAKE MOHAVE HIGHLANDS | 55-603417 | ND |
| 08068 | EPCOR WATER - NORTH MOHAVE VALLEY | 55-211751 | ND |
| 08068 | EPCOR WATER - NORTH MOHAVE VALLEY | 55-589061 | ND |
| 08098 | MOHAVE CNTY PARKS DEPT DAVIS CAMP | 55-505168 | ND |
| 08098 | MOHAVE CNTY PARKS DEPT DAVIS CAMP | 55-544186 | ND |
| 08038 | VALLEY PIONEERS WATER COMPANY INC | 55-623084 | ND |
| 08038 | VALLEY PIONEERS WATER COMPANY INC | 55-623082 | ND |
| 08020 | KINGMAN MUNICIPAL WATER | 55-905228 | ND |
| 08020 | KINGMAN MUNICIPAL WATER | 55-612657 | ND |
| 08020 | KINGMAN MUNICIPAL WATER | 55-612664 | ND |
| 13045 | PRESCOTT CITY OF | 55-219158 | ND |
| 13045 | PRESCOTT CITY OF | 55-212087 | ND |
| 13246 | USFS PNF AIRPORT FIRE CENTER | 55-577507 | 27.40 |
| 13261 | TRI-CITY PREP HIGH SCHOOL | 55-552567 | ND |
| 07045 | WICKENBURG TOWN OF | 55-624479 | ND |
| 04032 | PAYSON TOWN OF | 55-568624 | ND |

APPENDIX D CONT.

SCREENING RESULTS

| PWS ID # | PWS Name | Well # | PFOS + PFOA ng/L |
|----------|---|-----------|---------------------|
| 04032 | PAYSON TOWN OF | 55-521982 | 14.90 |
| 04032 | PAYSON TOWN OF | 55-564016 | ND |
| 04032 | PAYSON TOWN OF | 55-567988 | ND |
| 13036 | JACKSON ACRES DWID | 55-636907 | 6.80 |
| 13408 | BEVERLY GARDENS TRAILER PARK | 55-528525 | 4.00 |
| 13160 | DRY GULCH WATER COMPANY | 55-516466 | 166.00 |
| 03003 | ARIZONA WATER CO - SEDONA | 55-566709 | ND |
| 03003 | ARIZONA WATER CO - SEDONA | 55-616656 | ND |
| 13041 | OAK CREEK WATER CO 1 | 55-562092 | ND |
| 13041 | OAK CREEK WATER CO 1 | 55-603919 | ND |
| 03073 | FOREST HIGHLANDS WATER COMPANY | 55-562728 | ND |
| 07079 | VALLEY UTILITIES WATER COMPANY GLENDALE | 55-639720 | ND |
| 07079 | VALLEY UTILITIES WATER COMPANY GLENDALE | 55-208819 | ND |
| 07033 | TOWN OF QUEEN CREEK | 55-209407 | ND |
| 07021 | COUNTRY CLUB ACRES WATER INC | 55-505533 | ND |
| 07021 | COUNTRY CLUB ACRES WATER INC | 55-605607 | ND |
| 07307 | ADJC ADOBE MOUNTAIN SCHOOL | 55-614010 | ND |
| 07069 | GILA BEND TOWN OF | 55-573124 | ND |
| 07069 | GILA BEND TOWN OF | 55-222981 | ND |
| 07069 | GILA BEND TOWN OF | 55-504088 | ND |
| 08015 | EPCOR WATER - LAKE HAVASU | 55-594370 | ND |
| 08015 | EPCOR WATER - LAKE HAVASU | 55-221932 | ND |
| 04008 | CITY OF GLOBE | 55-526251 | ND |
| 04008 | CITY OF GLOBE | 55-611121 | ND |
| 08081 | GOLDEN VALLEY IMPROVEMENT DISTRICT | 55-530666 | ND |
| 08081 | GOLDEN VALLEY IMPROVEMENT DISTRICT | 55-530665 | ND |
| 07789 | DOUBLETREE PAPER MILL | 55-909462 | ND |
| 03048 | ANASAZI WATER COMPANY | 55-560179 | ND |
| 20092 | SIERRA COURT TRAILER PARK | 55-603669 | ND |
| 12004 | NOGALES CITY OF | 55-603394 | ND |
| 12004 | NOGALES CITY OF | 55-603393 | ND |
| 12004 | NOGALES CITY OF | 55-625344 | ND |

APPENDIX D CONT.

SCREENING RESULTS

| PWS ID # | PWS Name | Well # | PFOS + PFOA ng/L |
|----------|----------------------------------|-----------|---------------------|
| 12004 | NOGALES CITY OF | 55-603392 | ND |
| 12004 | NOGALES CITY OF | 55-574906 | ND |
| 12004 | NOGALES CITY OF | 55-574907 | ND |
| 02010 | BELLA VISTA CITY WATER SYSTEM | 55-610125 | ND |
| 10357 | METROPOLITAIN DWID | 55-208091 | ND |
| 03015 | MOUNTAIN DELL WATER INC | 55-802025 | ND |
| 03015 | MOUNTAIN DELL WATER INC | 55-802024 | ND |
| 13063 | PRESCOTT VALLEY WD LOWER SYSTEM | 55-612332 | ND |
| 13063 | PRESCOTT VALLEY WD LOWER SYSTEM | 55-613021 | ND |
| 13063 | PRESCOTT VALLEY WD LOWER SYSTEM | 55-550395 | ND |
| 20011 | CALPORTLAND RILLITO CEMENT PLANT | 55-610526 | 72 |
| 20011 | CALPORTLAND RILLITO CEMENT PLANT | 55-610527 | 76 |
| 20447 | TUCSON READY MIX ORANGE GROVE | 55-625466 | 86 |

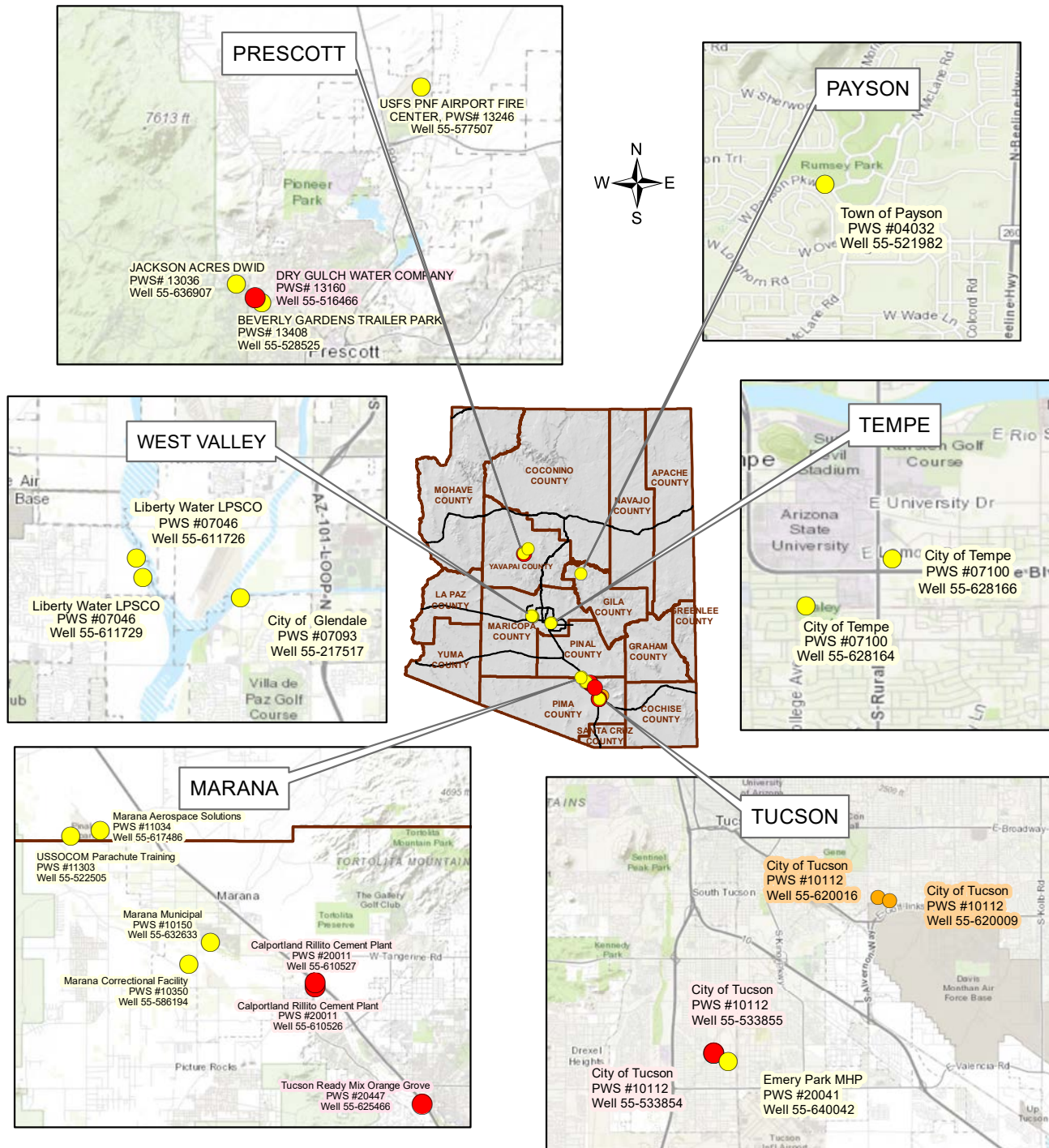
APPENDIX E

COUNTY RESULTS

| County | # of Samples | ND | Detects Below HA | Above HA |
|------------|--------------|----|------------------|----------|
| APACHE | 0 | 0 | 0 | 0 |
| COCHISE | 6 | 6 | 0 | 0 |
| COCONINO | 8 | 8 | 0 | 0 |
| GILA | 6 | 5 | 1 | 0 |
| GRAHAM | 0 | 0 | 0 | 0 |
| GREENLEE | 0 | 0 | 0 | 0 |
| MARICOPA | 31 | 26 | 5 | 0 |
| MOHAVE | 15 | 15 | 0 | 0 |
| NAVAJO | 1 | 1 | 0 | 0 |
| PIMA | 15 | 7 | 3 | 5 |
| PINAL | 3 | 1 | 2 | 0 |
| SANTA CRUZ | 6 | 6 | 0 | 0 |
| YAVAPAI | 12 | 8 | 3 | 1 |
| YUMA | 4 | 4 | 0 | 0 |
| LA PAZ | 2 | 2 | 0 | 0 |

APPENDIX F

MAPS



This map is for general reference only and may not be all inclusive. ADEQ program's data collection efforts are ongoing. More detailed information and specific locations can be obtained by contacting the Arizona Department of Environmental Quality.

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APPENDIX G

DRAFT PUBLIC NOTICE

Notice in response to EPA Drinking Water Health Advisories for PFOS and PFOA

On May 19, 2016, the Environmental Protection Agency (EPA) issued a health advisory regarding levels of Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) in drinking water. The health advisory limit is combined concentrations of PFOA and PFOS of 0.070 ug/L (parts per billion).

Recently, the Arizona Department of Environmental Quality (ADEQ) sampled **PWS Name** wells and found these chemicals in concentrations above the health advisory limits. We understand this information may cause you to be concerned. **PWS Name** is conducting regular sampling and analysis of our water sources to ensure that customers continue to receive drinking water that is in compliance with applicable health and environmental regulations.

PWS Name is notifying its customers that the health advisory levels are calculated to make the public aware of potential adverse effects on the most sensitive populations; fetuses during pregnancy, breastfed infants, and people with immunity issues. Though no harm is imminent, sensitive populations may seek an alternative water source with PFOA and PFOS levels below 70 ppt. Parents with formula-fed infants should consider using formula that does not require adding water or using an alternative source for infant consumption.

PWS Name is working with state and federal officials to find a long-term solution regarding PFOA and PFOS. In addition, we are taking the following corrective actions **PWS should list planned corrective actions here.**

To the extent that you would like more information regarding PFOA, PFOS, their health effects or the basis for the EPA's actions, the EPA's health advisory can be found on their website.

<https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>

APPENDIX H

CURRENT STATUS OF ADEQ'S WORK WITH IMPACTED PWSs

| PWS # | PWS Name | Data Source | Current Status |
|-----------------------|----------------------------|-----------------------|--|
| AZ0420447 | Tucson Ready Mix | ADEQ | Bottled water provided; ADEQ regional investigation ongoing |
| AZ0420011 | Calportland Rillito Cement | ADEQ | Bottled water provided; ADEQ regional investigation ongoing |
| AZ0413160 | Dry Gulch Water Company | ADEQ | Notice posted; treatment being considered |
| AZ408001 | Oatman Water Company | UCMR3 | Meeting the Health Advisory; ADEQ met with PWS; new plans have been submitted |
| AZ0407046 | Liberty Water LPSCO | UCMR3 | Granular Activated Carbon (GAC) filters installed at impacted wells |
| AZ0407100 | City of Tempe | UCMR3 | Wells are offline; ADEQ resampled at the well head |
| AZ0410112 | City of Tucson | UCMR3, City of Tucson | Wells are offline; ADEQ met with City to discuss treatment implementation; ADEQ regional investigation ongoing |
| AZ04 (all Marana PWS) | Town of Marana | UCMR3, Town of Marana | ADEQ is working to support Town efforts to install treatment; ADEQ regional investigation ongoing |

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